

**PRESCRIBED BURNING
SMOKE MANAGEMENT PLAN
LAWRENCE LIVERMORE
NATIONAL LABORATORY—SITE 300**

Wade A. Diebner

U.S. Department of Energy

Lawrence
Livermore
National
Laboratory

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LAWRENCE LIVERMORE NATIONAL LABORATORY– Site 300**

GENERAL INFORMATION

PREPARER'S NAME & ADDRESS (street, city, zip)

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DATE

February 6, 2004

PREPARER'S AFFILIATION

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PHONE #

(925) 423-1811

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Wade A. Diebner

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(925) 423-1811

LAND OWNER(S) & MAILING ADDRESS (street, city, zip) PHONE #

Department of Energy (DOE)
P.O. Box 808, L-1
Livermore, CA 94551

(925) 424-6494

FIELD CONTACT NAME & 24-HOUR PHONE/PAGER # (during burn)

Wade A. Diebner (925) 596-1811/(925) 423-7705 Pager: 01811/
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PROJECT DESCRIPTION

1. LOCATION

Lawrence Livermore National Laboratory – Site 300
Corral Hollow Road
Tracy, CA 95376

Latitude: 37 39.59

Longitude: 121 33.13

Legal Description

All that land delineated on the following filed maps: Map of Survey, United States Atomic Energy Commission Property, Counties of Alameda and San Joaquin, State of California, filed in Book 4 of Surveys, Page 3, in the office of the County Recorder, Alameda County, and filed in Book 11 of Surveys, Page 34, in the office of the County Recorder, San Joaquin County; Map of Survey, United States Atomic Energy Commission Property, County of San Joaquin, State of California, filed in Book of Surveys, Volume 10, Page 118, in the Office of the County Recorder, San Joaquin County;

EXCLUDING that parcel of land described in Quitclaim Deed from the United States of America to Robert F. & Carol J. Burns in Book 3887 of Official Records, page 369, San Joaquin County Records;

INCLUDING that parcel of land described in Grant Deed for Connolly Ranch, Inc. to the United States of America, Department of Energy in Instrument Number 91-020198, San Joaquin County Records.

Containing 6800 acres, more or less.

General Description

Lawrence Livermore National Laboratory's (LLNL's) Site 300 is located in the California Coast Ranges, which is characterized by low rugged mountains and relatively narrow intervening valleys. It is situated 15 miles east of the Livermore Valley near the eastern edge of the Altamont Hills, close to the western boundary of San Joaquin County. Elevations range from 500 feet at the southern boundary to 1800 feet at the higher peaks in the northwestern areas. Site 300 covers approximately 7000 acres (about 11 square miles) of land in eastern Alameda County and western San Joaquin County. Site 300 was acquired in 1953; since then all grazing and other agricultural activities have been terminated. The location of Site 300 is identified in **Figure 1**.

Figure 2 identifies the prescribed burn acreage of each of the 23 plots that are to be burned at LLNL's Site 300. The majority of the acreage falls under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The acreage that specifically falls under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) is approximately 7.5 acres of Plot 11 and 131.64 acres of Plot 16.

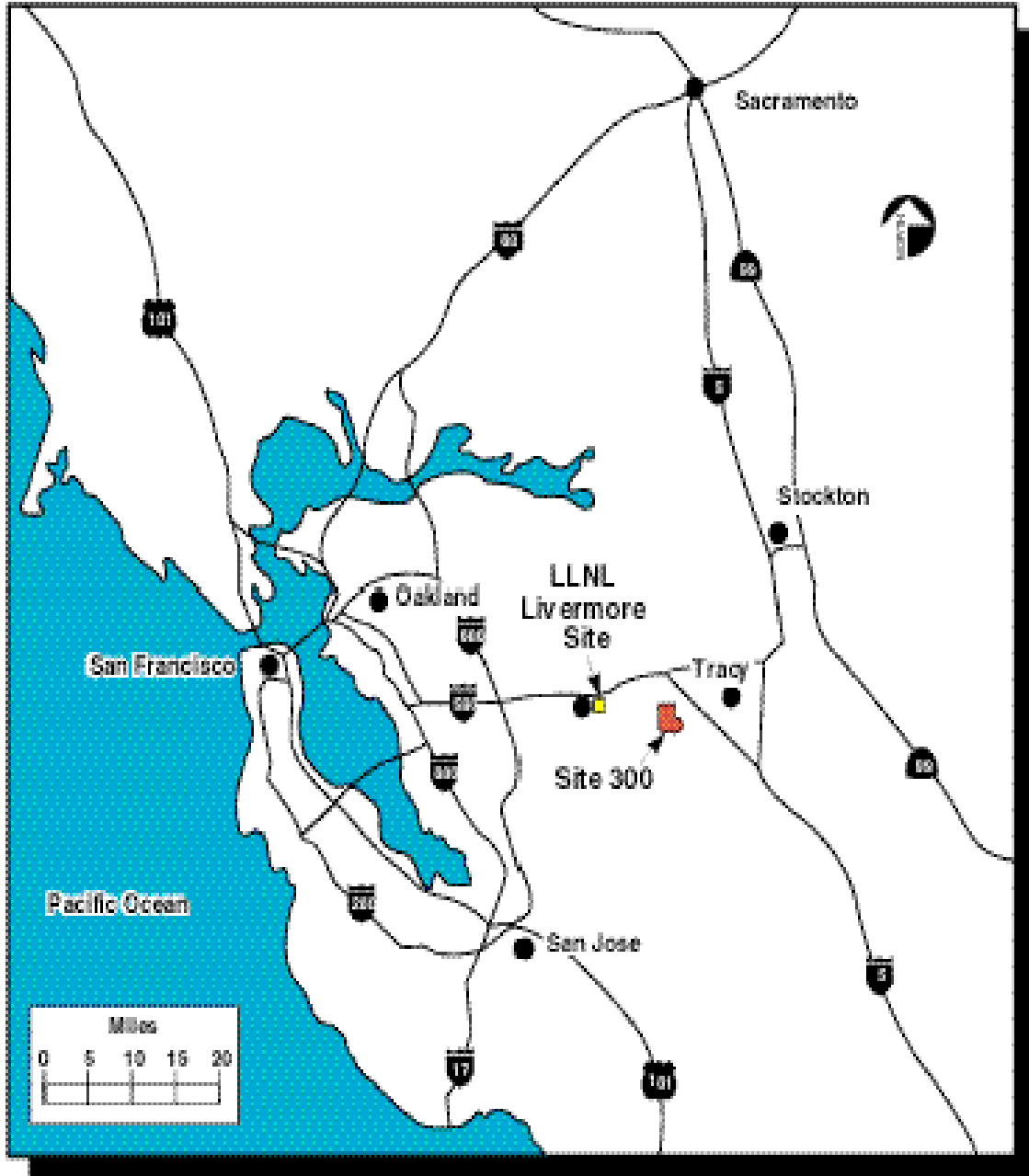


Figure 1. Location of Site 300

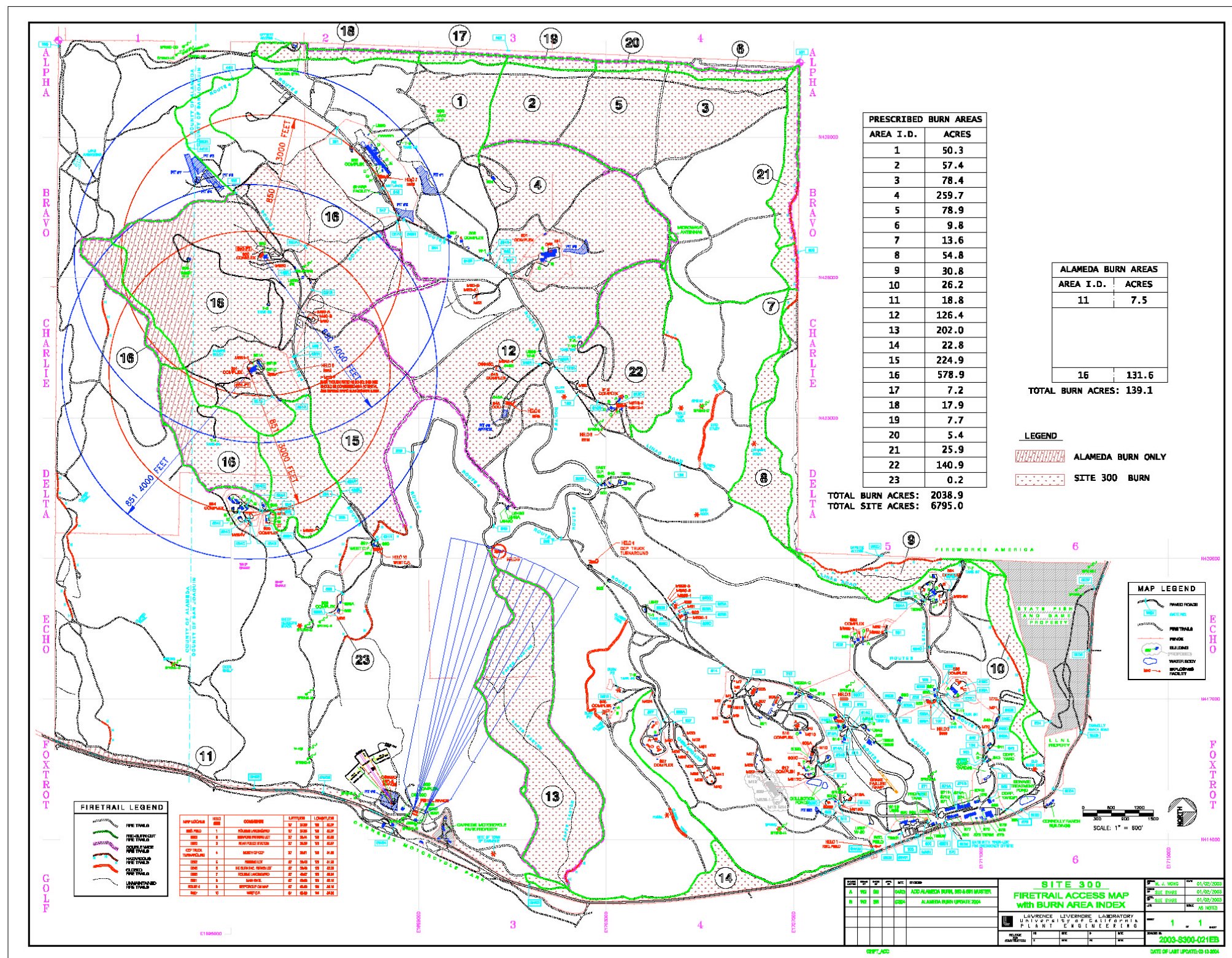


Figure 2. Site 300 Firetrail Access Map with Burn Area Index

2. OBJECTIVES

Specific Management Objectives

- Use prescribed fire and mechanically maintain and/or treat the Site's developed areas to reduce the threat of unwanted fire. Continue to maintain defensible space in accordance with WSS NFPA 299, Protection of Life and Property from Wildfire, around all critical facilities at Site 300.
- Meet the Bay Area Air Quality Management District's regulatory rules and policies as they pertain to prescribed burns and smoke management.
- Minimize the occurrences of fires that could leave the Site 300 boundaries and impact LLNL's neighbors.
- Manage and enhance plant biodiversity and wildlife habitat at Site 300 through the judicious use of prescribed fires.
- Provide a fire-safe barrier to prevent wildfires from entering Site 300.
- Minimize the occurrence of unnaturally intense fires by reducing the amount of vegetation that can fuel larger, more catastrophic fires.
- Limit the extent of prescribed fires, which would reduce the air quality for our neighbors.
- Use minimum impact prescribed burns and fire suppression techniques, and rehabilitate disturbed areas to protect natural and cultural resources from adverse impacts attributable to fire suppression activities.
- Conduct all fire management activities commensurate with applicable laws, policies and regulations.
- Cooperate extensively with adjacent landowners to facilitate safe and prompt suppression of wildfires.
- Suppress all wildfires in accordance with recognized wildfire safety parameters to assure minimal impacts on the environment and cultural resources.
- Engender understanding among fire fighters about the impacts of fire suppression on sensitive resources. Cutting of all firebreaks, fuel reduction, and fire suppression will be done to minimize the impact on the eco system from soil erosion.

Other Management Objectives

- Provide for the safety of employees, visitors, and neighbors during all phases of the wildland fire management process.
- Preserve and extend the capability to safely test explosives while protecting the environment.
- Provide opportunities for public understanding of fire ecology principles, smoke management, and prescribed fire program objectives.

3. PROJECTED ACREAGE

Figure 2 identifies the prescribed burn acreage of each of the 23 plots that are to be burned at LLNL's Site 300. The majority of the acreage falls under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The acreage that specifically falls under the jurisdiction of the BAAQMD is as follows:

Plot 11: 7.5 acres

Plot 16: 131.6 acres

Plots 11 and 16 are characterized as ungrazed annual grassland.

4. PROJECTED TONNAGE

The fuel loading for the project is ungrazed annual grassland estimated to be between 0.74 and 1 ton per acre (depending on the grass height, distribution, and density), and is based on the Albini (1976) and National Fire Danger Rating System (NFDRS) fuel models for Annual Grass.

Plot 11 7.5 tons (based on 7.5 acres at 1 ton per acre)

Plot 16: 278.2 tons (based on 139.1 acres at 1 tons per acre)

5. TYPE(S) AND ARRANGEMENT OF VEGETATION TO BE BURNED

Vegetation Type	% of Unit	Fuel Model Albini (1976)	Fuel Model NFDRS
Annual Grass	100%	1	A

Plots 11 and 16 are characterized as ungrazed annual grassland. The grass is approximately 4 to 24 inches (averaging less than 12 inches) in height with a uniform horizontal continuity and thin to moderate density.

6. FUEL CONDITION

Plots 11 and 16 are characterized as ungrazed annual grassland, which are natural standing.

7. COMBUSTION

The annual grass is considered a light, flashy fuel, and is expected to burn at approximately 100%.

8. PROJECTED BURN SCHEDULE

Proposed Dates

Plot 11 May 1, 2004 through August 1, 2004

Plot 16: May 1, 2004 through August 1, 2004

9. EXPECTED DURATION OF PROJECT

Of the two plots, 7.5 acres of Plot 11 and 131.64 acres of Plot 16 fall under the jurisdiction of the BAAQMD. Given the size of Plots 11 and 16, it is estimated that the duration of the prescribed burn for both Plots, under favorable conditions, can be completed in two (2) days. However, due to weather conditions, burn day approval, acreage allocations, spare the air days, resource availability, staffing, and requirements for U.S. Department of Energy (DOE) approval, the prescribed burns may take longer and may be completed by burning over a series of days that may or may not be consecutive.

(a) IGNITION

Plot 11: 15 minutes to 120 minutes for each day of burn

Plot 16: 15 minutes to 60 minutes for each day of burn

(b) COMBUSTION

Plot 11: 10 minutes to 30 minutes for each day of burn

Plot 16: 10 minutes to 30 minutes for each day of burn

(c) BURN DOWN

Plot 11: 20 minutes to 60 minutes for each day of burn

Plot 16: 20 minutes to 60 minutes for each day of burn

SMOKE MANAGEMENT COMPONENTS

10. DIRECTIONS AND DISTANCES TO NEARBY SENSITIVE RECEPTOR AREAS

The National Atmospheric Release Advisory Center (NARAC) at LLNL conducted smoke dispersion simulation modeling to better understand the atmospheric dispersion of smoke from prescribed burns at Site 300, and to examine how smoke behavior might differ for different burns and burn-plot terrain. The report on the simulations is entitled Smoke Dispersion Simulations for Prescribed Burns at Site 300, Lawrence Livermore National Laboratory. The report provides persuasive evidence that there were no air quality problems caused by the prescribed burns for which smoke dispersion was simulated. Furthermore, it is expected from the report that future prescribed burns will not adversely impact sensitive receptors in the areas surrounding LLNL's Site 300.

A summary of the report, Smoke Dispersion Model Report Summary, was submitted to the BAAQMD in May 2002, and again in the 2003 *Prescribed Burning Smoke Management Plan, Lawrence Livermore National Laboratory – Site 300*. As noted in the Report Summary, the simulated near-surface smoke plume extends in generally a southeasterly to a south-southeasterly direction from the Site 300 burn sites.

Figure 3, Sensitive Receptors within a 20-mile Radius of Site 300, identifies the sensitive receptors within a 20-mile radius of LLNL's Site 300. The map was updated in February 2004 and includes urban areas (i.e., cities), major roads, hospitals, nursing homes, schools, daycare centers, and airports.

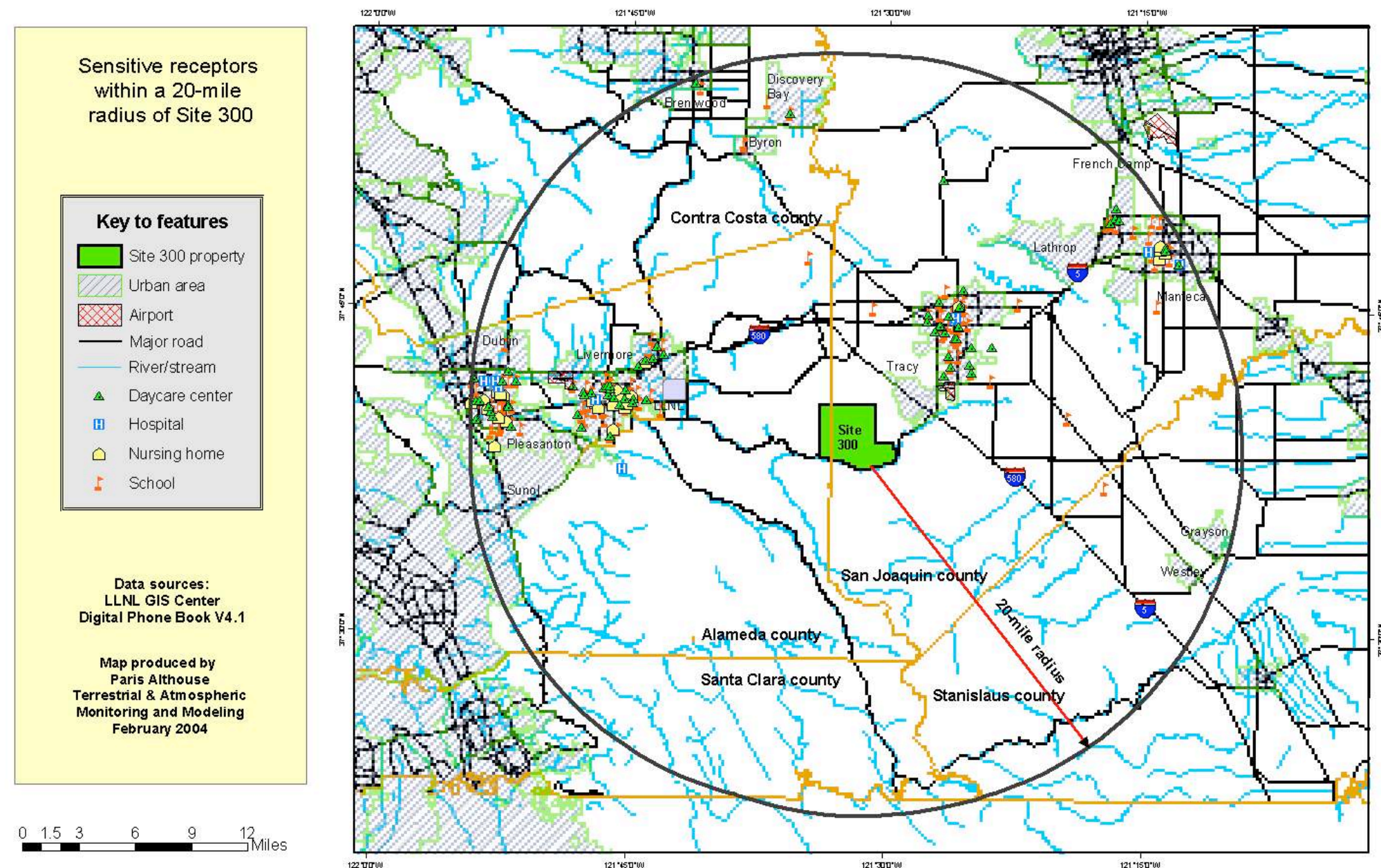


Figure 3. Sensitive Receptors within a 20-mile Radius of Site 300

11. METEOROLOGICAL PRESCRIPTION

	Range	Optimum	Observed
Temperature (F)	55-100	80	
Relative Humidity %	20-75	35	
Wind Speed (mph)	0-20	15	
Wind Direction	All	NW	
Fuel Moisture 1 hour (%)	3-16	7	
Minimum Forecasted Mixing Height (ft)	500	NA	

12. SPECIFICATIONS FOR MONITORING AND VERIFICATION OF METEOROLOGICAL CONDITIONS AND SMOKE BEHAVIOR BEFORE AND DURING THE BURN

Personnel and Equipment

All burns will be conducted with personnel and equipment as set forth in the LLNL Fire Department Policies and Procedures Manual, Tactical Plan number 1606.

A total of 10 chief officers, captains and firefighters will be present at all burns.

Staffing

1	Incident Commander	Chief Officer
1	Safety Officer	Chief Officer or Captain
2	Division Officers	Captains or Acting Captains
2	Torch Company Officers	Captains or Acting Captains
2	Torch Persons	Firefighters
2	Observation Personnel	Firefighters

Equipment

1	Command Vehicle
4	Patrols/Engines

Ignition Operations

At the beginning of each burn day, a small test ignition at the burn site will be conducted with a drip torch to observe ignition combustion rates and smoke behavior. Fire behavior and smoke conditions will be visually monitored to achieve compliance with the conditions set forth, herein. All conditions, including the meteorological prescription, will be satisfied before the Incident Commander makes a decision to continue burning.

Ignition operations will be conducted using those set forth in the LLNL Fire Department Policies and Procedures, Tactical Plan number 1606. Strip firing,

head firing, and backing fire ignition patterns will be used to ignite the plot. Firing patterns and directions could change depending on safety, wind direction, other weather parameters, or smoke management concerns.

Duration of project ignition will last approximately 15 minutes to 120 minutes for each plot. Combustion and burn-down time are minimal due to the light flashy fuels.

Smoke Management

Smoke volume from the project should not have a significant impact upon the surrounding communities. Due to its proximity of Corral Hollow Road, the southernmost perimeter trail along Corral Hollow Road is expected to be burned during non-commute hours (that is, between 9 AM and 2 PM). Winds from the north occasionally create decreased visibility hazards along Corral Hollow Road; these hazards can be minimized by partial closures and postings on the road.

Smoke emission and behavior will be visually monitored on a continual basis. Any significant change in smoke emissions and/or column behavior will be reported to the Incident Commander. The Incident Commander will manage the project in a manner that will minimize impact to sensitive areas and the public. The project size, firing tactics, and burn duration will be adjusted to meet these goals.

Monitoring and Evaluation Procedures

At 0645 hours on the day of the burn, the Captain at Fire Station 2 will log onto the LLNL internal web page at www-metdat.llnl.gov/ and select reports by 15-minute readings to obtain the current weather at Site 300. Under the S-300 column, check the following:

- Wind speed
- Wind direction
- Air temperature
- Relative humidity
- Under units on the LLNL web page and, where appropriate, select mph and F°.

During the burn, on-site monitoring will be conducted; and the Incident Commander will observe weather, smoke, and fire behavior.

On the day of the burn, the LLNL Fire Department Captain at Fire Station 2 will enter into the incident report for the controlled burn, the following information:

- Staffing and positions
- Duration of burn
- Plots burned

- Weather as captured at the start of the burn
- Total acreage burned for the day.

13. SPECIFICATIONS FOR DISSEMINATING PROJECT INFORMATION TO PUBLIC

Media Coordination and Public Notification

In advance of burn activities, the Environmental Protection Department at LLNL notifies neighbors and nearby residents of Site 300 of the intent to perform the annual burn project. This notification is conducted by mail and web using current contact information. LLNL points of contact are provided along with the Environmental Protection Department's Environmental Community Relations representative so individual questions/concerns can be addressed, e.g., specific timing for individual burn areas. In addition, a news release is prepared and distributed to local media, e.g., *Tracy Press*, *Stockton Record*, and *Tri-Valley Herald*, prior to the burn. The contact information telephone numbers allow for receiving and addressing complaints after the burn. However, few smoke-related complaints have been received as a result of LLNL's recent burns.

The LLNL fire dispatcher will notify the following agencies/personnel on the morning of the burn:

- National Nuclear Security Administration, Livermore Site Office – (925) 424-6494)
- SJVAPCD – (209) 557-6442 (only on days of burns in San Joaquin County)
- BAAQMD- (415) 749-4979
- California Department of Forestry, Emergency Communications Center – (408) 779-2121 (Ask the dispatcher to notify Castle Rock and Sunol stations)
- Alameda County Fire Department Station 8 – (925) 447-6611
- Site 300 /LLNL CAS operators – (925) 423-5222 and (925) 422-7222
- SRI – (925) 373-0185
- San Joaquin County Fire Dispatch – (209) 464-4648 (Ask the dispatcher to notify Tracy Fire Department)
- Site 300 Deputy Business Manager – (925) 423-5217
- EPD ECR Manager – (925) 424-4026.

Twin Valley fire departments, which include Livermore-Pleasanton, Alameda County, Camp Parks, and San Ramon Valley fire departments, are notified using the mutual aid radio frequencies.

14. WHAT CONTINGENCY ACTIONS WILL BE TAKEN DURING THE BURN TO REDUCE EXPOSURE IF SMOKE INTRUSIONS IMPACT ANY SENSITIVE RECEPTOR AREA

This project will be conducted in a manner that will avoid smoke intrusion into any smoke sensitive area. In the event a smoke intrusion does occur in a smoke sensitive receptor, the following actions will be taken to reduce smoke production, if appropriate:

- Halt ignitions, except as needed to maintain control of fire
- Reduce the size of the burn plot by developing new control lines
- Suppress active fire
- Initiate mop-up operations once fire is controlled
- Focus suppression and mop-up operations on areas of greater smoke production
- Resume burn, if favorable conditions return
- Contact the LLNL Public Information Officer
- Notify the affected populations.

Although not a credible event, a prescribed fire leaving Site 300 and entering a neighbor's grazing land would be extinguished with the resources described herein. Lands that border Site 300 on the west, east and north are used for cattle grazing. These grasses are very similar to those found at Site 300 with the exception of the grass height. Grasses that have been grazed are usually less than three inches tall. In order for a wildfire to reach a populated area, a fire would have to burn unchecked for a distance of approximately 9 miles, through the grazed grass, jump Interstate-580 and two aqueducts, and burn through fields of irrigated crops before reaching the City of Tracy.

The primary fire suppression responsibility for the area lies with the LLNL Emergency Management Division's Fire Department. Response is provided from both the LLNL fire stations. The fire department is supported by a strong secondary response by all the Alameda County fire departments and the California Division of Forestry. Mutual aid agreements between the LLNL Fire Department and the Alameda County fire departments and the California Department of Forestry have been in place since 1960. A Mutual Threat Zone Agreement is also in place with California Division of Forestry. This agreement provides aircraft, helicopters and air command aircraft in addition to their basic response of eight engines, two bulldozers and a battalion chief.

15. ATTACH A COPY OF THE ENVIRONMENTAL IMPACT ANALYSIS PREPARED FOR THE BURN PLAN THAT INCLUDES AN EVALUATION OF ALTERNATIVES TO BURNING, IF SUCH AN ANALYSIS IS REQUIRED BY STATE OR FEDERAL LAW OR STATUTE

The DOE's principal vehicle for compliance with National Environmental Policy Act (NEPA) at LLNL and Site 300 is the 1992 Final Environmental Impact Statement and Environmental Impact Report (EIS/EIR), the 1997 Environmental Impact Report Addendum, and the 1999 Supplement Analysis to the 1992 EIS/EIR. These NEPA compliance (EIS) and California Environmental Quality Act (CEQA) compliance (EIR) documents were prepared to analyze the impacts of the proposed action of continued operation of LLNL and Site 300.

Prescribed burning is discussed throughout the EIS/EIR sections appropriate to the context, including safety, wildfire prevention, Site 300 testing requirements, natural resource impact, and potential impact to neighbors and planned adjacent communities. LLNL reviews the plans for each year's controlled burns to insure that all operational, fire safety, regulatory, and community notification issues are addressed, and that adequate DOE NEPA coverage is available.

LLNL requires that all LLNL operations be conducted in a manner that preserves the quality of the human environment and complies with the letter and spirit of all applicable governmental regulations and DOE Orders.

In May 2002, LLNL submitted to the BAAQMD a copy of the Final Summary Document for Controlled Burning at Site 300. The document describes the measures LLNL has taken to ensure the effectiveness and safety of its controlled burn operations at Site 300, and includes additional measures taken in light of the Cerro Grande Fire in New Mexico. The document summarizes reviews and analyses of the LLNL prescribed burn program from LLNL procedures and NEPA documents such as the 1992 EIS/EIR.

A full range of alternatives to burning has been considered. All of which modify approved land use, destroy wildlife habitat, create erosion, or are unsafe. Those alternatives include:

- Grazing
- Sterilization
- Planting fire-resistive, non-native vegetation
- Disking
- Mowing.

16. PROJECT FUEL LOADING ESTIMATE (TONS VEGETATION/ACRE) BY VEGETATION TYPE(S) AND A DESCRIPTION OF THE CALCULATION METHOD

The fuel loading for the project is ungrazed annual grassland estimated to be between 1 and 2 tons per acre (depending on the grass height, distribution, and density), and is based on the Albini (1976) and National Fire Danger Rating System (NFDRS) fuel models for Annual Grass.

Plot 11: 7.5 tons (based on 7.5 acres at 1 tons per acre)

Plot 16: 139.1 tons (based on 139.1 acres at 1 tons per acre)

Vegetation Type	% of Unit	Fuel Model Albini (1976)	Fuel Model NFDRS
Annual Grass	100%	1	A

17. PARTICULATE MATTER EMISSIONS ESTIMATE INCLUDING REFERENCED EMISSION FACTOR(S) AND A DESCRIPTION OF THE CALCULATION METHOD USED

EPA's Compilation of Air Pollutant Emission Factors (AP-42)

PM 10 = 10 g/kg

Fuel Load = 1 tons/acre

PM 10 g/acre = 1 tons/acre x 2000 lbs/ton x 1 kg/2.2 lbs x 10g/kg
= 9090.91 g/acre
= 9.091 kg/acre

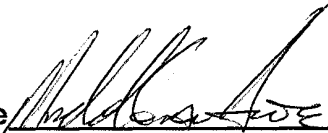
PM 10 tons/acre = 9.091 kg/acre x 2.2 lbs/1 kg x 1 ton/2000 lbs
= 0.010 tons/acre

Plot 11: 7.5 acres x 0.010 tons/acre = **0.075 tons (PM 10)**

Plot 16: 131.6 acres x 0.010 tons/acre = **1.316 tons (PM 10)**

CERTIFICATION

18. I HEREBY CERTIFY, AS A QUALIFIED PROFESSIONAL RESOURCE ECOLOGIST, BIOLOGIST, OR FORESTER, THAT THE PROPOSED BURNING DESCRIBED ABOVE IS NECESSARY TO ACHIEVE THE SPECIFIC MANAGEMENT OBJECTIVE(S) OF THE SMOKE MANAGEMENT PLAN PREPARED FOR THIS BURN PROJECT

Signature  Date 3-15-04

Name (print) Michael G. van Mattem

Title (print) WILDLIFE BIOLOGIST

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